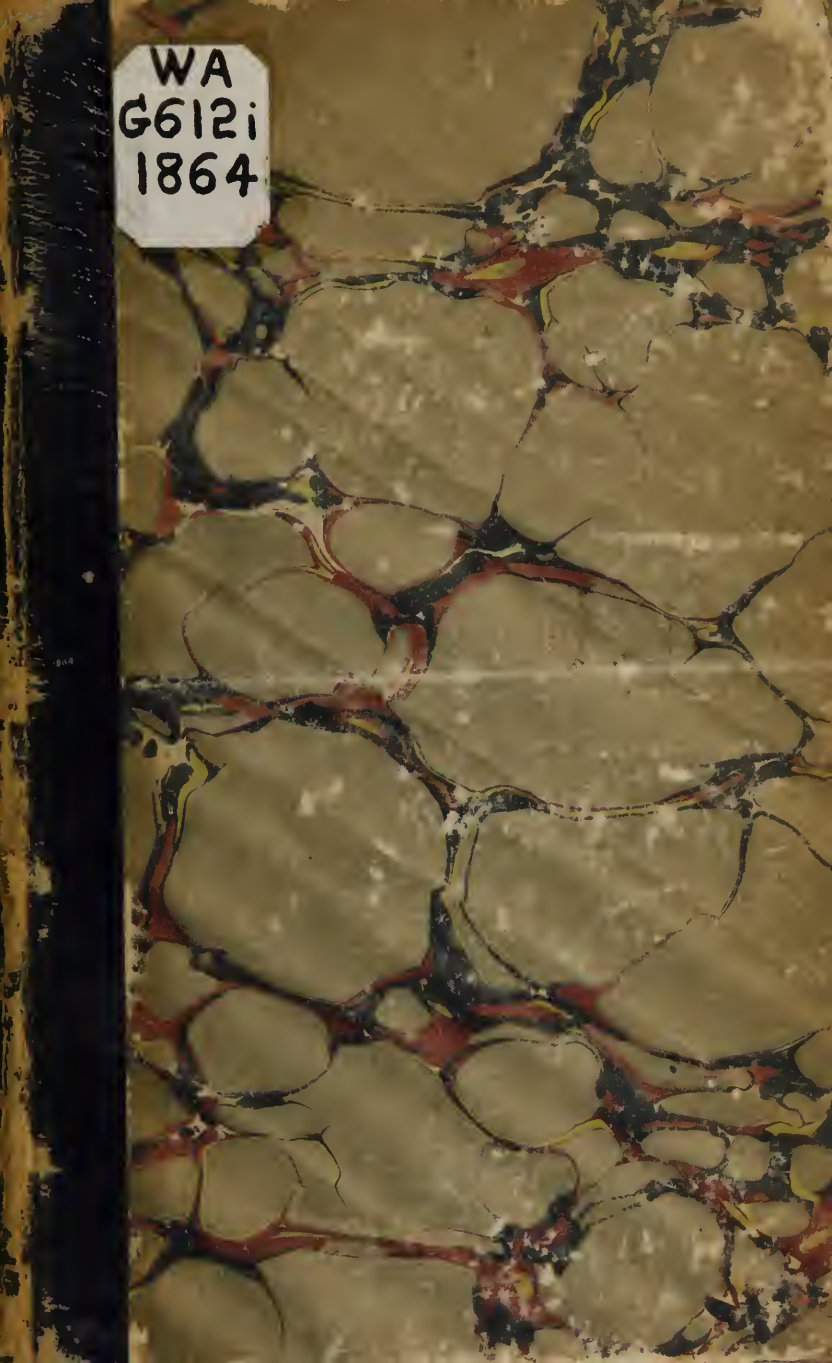


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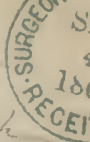
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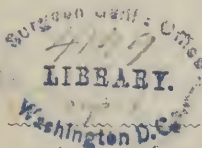


ILLUSTRATED SYSTEM

OF

BANDAGING.

(SELECTED FROM GOFFRES PRÉCIS DE BANDAGES.)



BY ORDER OF THE SURGEON-GENERAL.

RICHMOND:
AYRES & WADE.

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GENERAL DESCRIPTION

OF

BANDAGES.

Bandages receive names from their composition; they are termed *simple* when composed of one piece, and *compound* when composed of one or more pieces, whether separate or sewed together. The different pieces of a bandage may be *simple*, or *split into a number of tails*, or *perforated*; some are both *split* and *perforated*.

The mode of application, as well as their shape, also give names to bandages: such as the *circular*, the *spiral*, the *cross*, the *spica*, the *invaginated*, the *figure of eight*, the *T bandage*, etc. The appropriateness of these names is sufficiently indicated in the descriptive application of each.

There is another system of bandaging, to which the French give the name of *Linge Plein*, executed with handkerchiefs, napkins, cravats, square pieces of linen, etc. These appliances do not, however, justify the enthusiasm of their patron, M. Mayor. They answer very well for *slings*, but their application cannot be made sufficiently uniform to serve the purposes of support afforded by the ordinary bandage.

Bandages are a kind of support, whose length and breadth ought to be proportioned to the parts to which they are applied, and they should never exceed twelve yards in length and three inches in breadth; bandages longer or wider than this are difficult to roll, hard to maintain, and awkward to apply. Ordinary bandages are from one and a half to two

and a half inches broad and three yards long. The ends of a bandage are called *initial* and *terminal*; their surfaces *internal* and *external*; and their borders *superior* and *inferior*.

Bandages may be prepared with the tissues of hemp, flax, cotton, wool, and even caoutchouc. The English prefer woollen bandages, which, according to them, compress without binding tightly, and adapt themselves, by their elasticity, to the different changes of volume which a part may undergo, keep up an equable and gentle warmth, and preserve, for a long time, the liquids of fomentation. But, despite these advantages, they are little employed; their cost is too great; they become easily soiled; shrink when washed, and absorb with great facility putrid matters, of which it is very difficult to cleanse them.

The bandages most commonly employed are such as are made from linen or cotton. When they are not intended to come in contact with the parts, it matters but little whether they are made of linen or cotton; in the contrary case, linen should be preferred to cotton, which heats and irritates the delicate and susceptible skin.

Dr. Gariel, who has made in surgery such happy applications of vulcanized India-rubber, has proposed bandages made with this substance. Experience has taught us that their application is easy and uniform; but their expansion by heat, their contraction by cold, the obstacle which they oppose to cutaneous transpiration, and, above all, the difficulty of regulating, in an adequate manner, the degree of constriction, force us to regard them as only calculated to fulfill some particular indications.

"Bandages," says Hippocrates, "should be light, supple, clean, without seams or eminences, strong, in order that they may stand traction, or even offer a little more resistance." It is also important that they should be cut by a straight thread; without this, their edges ravel, become fringed, tangled, and they are difficult to apply. Unfortunately, it is not easy to obtain a straight thread; therefore, it has been proposed, in place of it, to secure each edge of the bandage by a whip-stitch. This, however, is difficult to effect; for, if the stitch be at all tight, the edges of the bandage offer more resistance than its body, and then the bandage compresses in an unequal manner and produces often intolerable pain. To remedy this inconvenience, the Germans fabricate their bandages with a

loose, light, porous tissue, woven like silk ribbon; that is to say, with a long horsehair in the edges, which is immediately withdrawn, and which leaves, instead of a selvage, a series of little curls, by the aid of which they stretch and take with great facility. These bandages appear to be exceedingly convenient; they were long ago recommended by Percy, who gave them the name of *bandes bouclées*, and they have been eulogized by all authors who have devoted themselves to the subject of bandaging. It would be desirable to have them adopted in all hospital establishments, where, despite the expense, bandages are so defective.

Sometimes bandages are not long enough and have to be pieced; this operation should be performed with care. Two processes may be adopted: in the first, the two ends are laid one upon the other and sewed together face to face; in the second, the two extremities are brought together and secured by a seam half an inch from their edges, each end being then turned back upon its respective bandage and sewed down. There is no preference for one or the other of these modes of joining a bandage; both of them enable us to avoid ridges and inequalities, and are preferable to other methods recommended by certain authors.

In order to be able to make use of a bandage, it is indispensable to roll it upon itself in such a manner as to give it, either the form of a single cylinder, in the centre of which is found the terminal end, while the initial end is free, or in the form of two cylinders; in this way it is rolled by its two ends until they meet at a given point. In the first case, it is called a *single-headed roller*; in the second, it is called a *double-headed roller*.

It is not such an easy matter, as at first supposed, to roll a bandage well; a good deal of pains ought, therefore, be taken to accustom one's-self to it. A bandage badly rolled yields and escapes from the fingers, and is very difficult to apply; when, on the contrary, it is well rolled, it can be held firmly, and applied with more dexterity, promptitude and precision. To wind a bandage well, the terminal end must be seized and folded four or five times upon itself, in the form of a small roller, which is seized with the thumb, the index and middle fingers of each hand, in such a way as to impress several turns of rotation upon itself; when it has acquired a certain volume, its axis is placed between the pulp of the thumb, of

the second and third fingers of the left hand, while the portion not rolled is seized between the thumb and the radial border of the right index, in order to stretch and direct it. That done, the roller is made to rotate upon itself by the aid of the middle, ring and little fingers of the right hand, which are at the same time to maintain it in the palm of the same hand. When the roller has been made to execute a certain number of turns, and it is perceived not to be sufficiently tight, it must be held immovable between the fingers of the left hand, while the bandage is pulled with force by the right hand. If a single traction is not sufficient, it is repeated as often as necessary, and we thus succeed in giving to the bandage the firmness necessary for its proper application.

When the bandage is to be made into a double-headed roller, each one of its ends is rolled in the same manner alternately until they meet; ordinarily, more volume is given to one roller than the other, in order that one of the ends may be fixed and the bandage terminated with more regularity.

The rules relative to the application of bandages differ according as they are wound in one or two rollers.

To apply regularly the *single roller bandage*, the roller must be held between the extremity of the thumb and the index and middle fingers of the right hand (pl. 1, A, fig. 1), unwind it lightly, while the initial end is held upon the point diametrically opposite the wound with the pulp of the thumb and index finger of the left hand (B fig. 1); it is fixed by two or three circular turns (2, 3, 4, fig. 2), and continued until the bandage is exhausted, when it is applied to a part entirely cylindrical; when, on the contrary, it is applied to a conical part, such as the superior or inferior limbs, it is necessary, in order to avoid the *funnels*, which would cause the bandage to lose all of its solidity, to have recourse to the circumvolutions known under the name of *dolives*, which are interrupted by what are called *reverses*. This is done by making obliquely with the aid of the left thumb (A, fig. 2), on the external face of the bandage, a fold upon itself, in such a way that the superior edge becomes inferior (5, 5, 6, 6, 7, 7, 8, 8, 9, 9, fig. 2), and that it thus becomes applied alternately upon the one and the other face.

When the bandage is not intended to cover a long surface, you may, instead of securing the initial end, let it hang free five or six inches, and fix it thus by circular turns, as in the

preceding process. The hanging end may then be tied to the terminal, and thus serve to finish the bandage and secure its solidity.

When the bandage is entirely applied it may be secured, either by proceeding as we have just intimated, or by splitting the terminal end and tying the two strips which result from this section, or by means of a needle and thread, or, lastly, which is the most usual, by means of pins. "They should always," says M. Gerdy, "be attached in such a manner that the convexity of the part does not make the point salient; that the latter, concealed in the thickness of the turns of the bandage, does not wound either the patient in the interval, or the surgeon at the moment of the dressing. Nor should the point of the pin be turned towards the end of the bandage, because, if the points of the pins were not solidly fixed by traversing alternately the end of the bandage and the circular turns which are below, they would easily become detached."

Whatever be the method resorted to, the last turn of the bandage must be fixed at a point diametrically opposite to the part injured: we thus avoid the pain of inconvenient pressure; when the length of this turn is insufficient for following this precept, it must be shortened by folding it back to a convenient distance.

The application of the *double-roller bandage* is much more difficult, and it requires a good deal of practice to succeed in executing it skillfully. M. Gerdy being of all authors the one who has given the best precepts with regard to it, we will borrow from him the description of the following procedure, which he designates under the name of *intercrossing by reverse*. We have endeavored to render it comprehensible in figure 3, plate 1, and in the smaller figure 7, plate 2.

"Seize," says he, "the two rollers with both hands, apply the external face of the bandage over one of the points of circumference of the part to be covered by the bandage; then unwind at the same time and in an equal manner the two rollers around this part (1, 1', pl. 1, fig. 3), until you have conducted them to a point opposite to that where you commenced the bandage; there deviate obliquely one of the two rollers above or below; continue, on the contrary, to carry the other and its band, following a horizontal line, until this band encounters that of the first, over it and cross it by

forming with it an acute angle; then return and *reverse* obliquely the first roller and the band deviated over the circular which covers it and crosses it (plate 2, minor figure 7); then make the two rollers follow their primitive direction; bring them back a little above the point of departure, and recommence in front the same manœuvre made behind (2, 2', pl. 1, fig. 3); go on in this way to the end of the band (3, 3', 4, 4', pl. 1, fig. 3), and secure the last circumvolutions, as well as one of the ends, by horizontal circular turns made with the most voluminous roller."

Besides the manual regulations which we have just traced, the application of bandages is subject to other precepts, the importance of which we cannot too strongly enforce. Thus the surgeon should place himself in such a convenient attitude and in such a manner as not to have to move when passing the bandage around the patient. The latter should be placed in the most convenient position for sparing him pain, and in such a way that the wounded part may not be exposed to any jostling or intemperate pressure. The bandage should be neither too loose nor too tight; in general, all those which are not employed with a view to compression, should only be light enough to insure necessary solidity. Unfortunately, it is far from being easy to hit the proper degree of constriction; this precision can only be acquired by habit and long practice. We are disposed to think we have obtained this point when the parts form above the circumvolutions a slight prominence, soft, easily depressed, and not painful to the touch. When, on the contrary, the parts are the seat of violet-colored swelling, numbness and lively pain, it is an indication that the bandage is too tight; we must hasten then to relax it, in order to avoid the development of gangrene. For the rest, the degree of constriction given to the bandage varies according to its humidity or dryness. With a view of obtaining in this respect fixed rules, A. Berard practised some experiments, of which the following is the result:

1st. Whether a bandage is applied dry or moistened, the pressure exercised by it augments with the number of turns that it describes; if, for example, Regnier's dynamometre, upon which it is wound, marks eleven degrees at the tenth turn, it will mark a little more at the fifteenth, a little more still at the twentieth.

2d. All things being otherwise equal, a moist bandage

presses more strongly than a dry one: thus, in many consecutive experiments, the same bandage has been seen, applied dry and moist, mark two or three more degrees in the second case than in the first.

3d. A bandage, whether applied dry or wet, gradually relaxes in such a way that the pressure exercised by it diminishes from day to day; but, if it is wet, the pressure diminishes much more rapidly and completely, because this phenomenon depends at once upon its desiccation and relaxation: therefore, the pressure exercised by a dry bandage is less, but persists longer, and is more uniform; that obtained from a wet bandage is greater, more unequal, and less constant.

4th. When a dry bandage is applied and left in place for several days, the pressure descends several degrees: if the bandage is then moistened without being deranged, it tightens rapidly and to such an extent, that the pressure exceeds the degree that it had attained at the moment of application; but in proportion as the apparatus dries, the turns of the bandage relax, the pressure diminishes anew, falls lower than ever, and even ceases sometimes entirely.

Whatever be the purposes and the form of a bandage, the man of art should know how to combine efficacy with dexterity and elegance. A bandage well applied inspires more confidence, re-assures the patient, persuades him that all possible care has been taken to insure his cure, and gives, at the same time, a good opinion of the surgeon. In that we should imitate A. Pare, and say, with him, "after having applied a bandage, we should see that it has been properly done, that it is comely to the view, in order to content the patients and friends, for every one in his profession should embellish his work as far as possible."

BANDAGES FOR THE HEAD.

In general, all bandages of the head flatter and please the eye when they are well applied, but they are difficult, complicated, and it is only by the aid of frequent practice that we succeed in giving them proper regularity. The spherical form of the head and the presence of the hair favoring the slipping of the bandages, we are generally much disposed to apply them too tightly; it is, however, very essential to avoid this excess, for they then become oppressive, occasion severe pain, and may often cause dangerous complications. The best means of succeeding is to first cover the head with a cap; this simple precaution will enable us to give to the bandage sufficient solidity without increasing the constriction. It should be employed in all bandaging for the head, and we beg the reader to remember this statement, in order to avoid the monotony of repeating it at each description.

CIRCULAR FOR THE FOREHEAD AND EYES.

Composition.—A bandage four yards long and from one and a half to two inches broad.

Application.—Cover the head with a cap and fix the initial end of the bandage over the forehead by two circular turns; then descend little by little over the eyes, making four or five additional circles; mount again over the forehead, make a last turn, and fasten the bandage on one side of the head with a pin.

Uses.—This bandage is exceedingly simple. It is used to protect the eyes, to shade them from the contact of light, and to maintain topical applications in ophthalmia, lachrymal fistula, or after the operation for cataract.

CROSS FOR ONE EYE.—FIRST VARIETY.

(PLATE 2, FIGURE 4.)

Composition.—A bandage six yards long and from one and a half to two inches broad.

Application.—If you wish to cover the right eye, place the initial end of the bandage above this eye, and make a circular horizontal turn from the forehead, passing above the eyebrows and the ears (1, 2). Having arrived at the nape, pass under the right ear and come towards the angle of the lower jaw; from thence mount obliquely over the cheek, the internal angle of the eye, and the root of the nose; gain the left parietal protuberance (3), re-descend to the nape, and make a circular turn of the forehead (4); returned to the nape, repeat a similar oblique and a similar circular turn (5, 6), taking care not to cover the first turns of the bandage more than half way; repeat the same manœuvre two or three times (7, 8, 9), and terminate by circular turns around the head (10).

Uses.—They are the same as those of the preceding bandage. This variety for the eye is not very solid; it requires to be watched and frequently re-applied. It will be understood, of course, that if the bandage is intended to cover the left eye, it should be applied in an inverse sense.

SECOND VARIETY.

(PLATE 2, FIGURE 5.)

Composition.—A bandage from seven to eight yards long and from one and a half to two inches broad.

Application.—If it is the right eye which is to be covered, leave hanging over the right side of the body of the lower jaw a pendant jet, about three-quarters of a yard in length; then carry the bandage obliquely over the cheek, mounting towards the internal angle of the right eye, the root of the nose, the forehead, the left parietal protuberance (A, 1), and descend to the nape; from there come below the right ear, and fix, by a semi-circle of the neck (A, 2), the pendant (B, 1). Arrived at the nape, ascend obliquely above the right ear, make a horizontal circle of the forehead (A, 3) to fix there the jet (A, 1). Returned to the nape, pass below the right ear to make a second semi-circle of the neck (A, 4), in order to

fix the jet (B, 2), that you have taken care to raise as far as the forehead, before the passage of the circular turn. From the nape return to the forehead, making a second horizontal circle (A, 5), which will fix the jet (B, 2). Reverse then this jet, in the form of an ear, over the circular (A, 5'), and direct it towards the neck to form the jet (B, 3). From the nape, make a third semi-circle of the neck (A, 6), which will fix the jet (B, 3). Elevate this jet, it will form then the jet (B, 4), destined to be carried upon the forehead, when a third circle of the forehead (A, 7) will have fixed the ear of the jets (B, 2, and B, 3). Then fix to the neck, by a fourth semi-circle (A, 8), the ear formed by the jets (B, 3) and (B, 4), and return to the nape, to make from thence a fourth circle of the forehead (A, 9). Reverse upon this circle, in the form of an ear (B, 5), what remains of the three-quarters of a yard forming the pendant jet, and finish by circular turns around the head with the roller (A, 10).

Uses.—This bandage is much more solid than the preceding; it should be employed in all cases where it is necessary to exercise pressure over the fronto-oculo-nasal region.

CROSS FOR BOTH EYES.—FIRST VARIETY, WITH ONE ROLLER.

(PLATE 2, FIGURE 6.)

Composition.—A bandage from seven to eight yards long and from one and a half to two inches broad.

Application.—Place the initial end of the bandage above the right eyebrow, and fix it by a horizontal circular turn around the forehead (1, 2). Arrived at the nape, pass below the right ear, gain the angle of the right lower jaw; ascend obliquely over the cheek, the internal angle of the eye, and the left parietal protuberance, taking the precaution to pass the bandage between it and the pavilion of the ear (3). From thence gain the nape, ascend obliquely towards the summit of the right parietal protuberance, descend towards the root of the nose, the external angle of the left eye, and the left angle of the lower jaw (4). Return then to the nape, and fix the two obliques by a circle around the forehead (5). The nape reached, gain the right angle of the lower jaw, and make a second oblique, which will cover the first for two-thirds, from the internal angle of the eye towards the external angle (6);

gain the left parietal protuberance, and cover the first plane of bandage from below upwards; regain then the right parietal protuberance by acting in an inverse sense—that is to say, by covering the plane of the bandage (4) from above downwards (7); cover the left eye, make a fourth circle of the forehead (8), then two new obliques (9, 10), and terminate by circular turns around the forehead (11).

SECOND VARIETY, WITH THE DOUBLE ROLLER.

(PLATE 2, FIGURES 7 AND MINOR 7.)

Composition.—A bandage eight yards long, by one and a half to two inches broad, rolled into two heads of unequal size.

Application.—Place the face of the bandage upon the anterior and middle part of the forehead, above the eyebrows (1, 1'); direct the two rollers above the ears, descend to the nape, intercross the two rollers by reversing the inferior (1, 2, minor fig. 7) upon the superior (1', 2', minor fig. 7). Change them from hand to hand, bring them back upon the angles of the jaw, ascend obliquely over the cheeks and the root of the nose, where you will intercross in the form of an X, by passing the one held in the right hand below the other (2, 2'). Change hands with the rollers, and direct them over the parietal protuberances, in order to descend to the posterior part of the occiput, where you will intercross them again by repeating the reverse. From thence, after having changed hands again with the rollers, bring them back horizontally over the forehead, where you will intercross them by reversing the inferior over the superior (3, 3'); conduct them to the nape, in order, after having crossed them, to bring them back over the angles of the jaw. Repeat in this way, four or five times, the intercrossings at the nape, the X of the nose and the horizontals of the forehead (4, 4', 5, 5', 6, 6', 7, 7', 8, 8'), and terminate by circular turns around the head, in order to secure the different planes of the bandage, as indicated at page 8.

Uses.—The double cross fulfills for both eyes the same indications as in the single cross for one eye. The first variety is far less solid than the second; the latter, on the other hand, is much more difficult of application.

SIMPLE CROSS FOR THE LOWER JAW.

(PLATE 3, FIGURE 8.)

Composition.—A bandage eight yards long, by one and a half to two inches broad.

Application.—Make two horizontal circular turns of the forehead (1, 2). Arrived at the nape, pass under the right ear, if the disease for which the bandage is applied is on the left side, and *vice versa* if it is on the right; then under the chin; from whence you will mount towards the left temple in passing over the angle of the jaw; from thence ascend directly, between the anterior part of the ear and the external angle of the eye, to the vertex (3); from whence you will take an oblique direction towards the right ear, over which you will pass the bandage: then pass again under the chin, to return to the vertex, continuing to direct the bandage between the left ear and the external angle of the orbit (4); pass again over the right ear, return under the chin and over the vertex, in order to repeat a third vertical circle (5). Having arrived under the chin, direct your roller towards the nape (6), so as to bring it back to the forehead, in order to make a horizontal circle (7); arrived at the nape, conduct your bandage over the chin by passing immediately beneath the lower lip (8); make a second circle similar to this last (9), but a fraction of an inch lower. From the nape, pass under the chin, taking care to include a part of the lower border of the preceding turn between it and the chin; then, after having made a fourth and fifth vertical circle (10, 11), return under the chin, gain the nape (12), and finish by circular turns around the head (13).

Uses.—This bandage is employed to insure immobility of the lower jaw in cases of fracture and luxation. It will also answer for maintaining topical applications upon and under the chin, as well as over the parotid region.

DOUBLE CROSS FOR THE LOWER JAW.—FIRST VARIETY,
WITH ONE ROLLER.

(PLATE 3, FIGURE 9.)

Composition.—A bandage ten yards long, by one and a half to two inches broad.

Application.—Make two horizontal circular turns of the forehead (1, 2); arrived at the nape, conduct the bandage obliquely under the right ear, make a semi-circle of the neck (3), pass under the chin, then cover the left angle of the lower jaw, and ascend, in passing between the external angle of the eye and the anterior part of the ear, towards the forehead. Direct then your bandage obliquely between it and the summit of the head, so as to reach the right parietal protuberance and the nape (4); from thence come over the left parietal protuberance, pass again between the forehead and the summit of the head, and descend, after having crossed the turn (4), under the chin in passing behind the right angle of the lower jaw (5). From the chin, pass again over the left angle of the lower jaw, ascend again to the forehead, regain obliquely the nape (6), the left parietal protuberance, the right angle of the lower jaw and the chin (7), in crossing the turn (6). From the chin, pass again, for the third time, over the left angle of the lower jaw, so as to ascend again to the forehead; descend to the nape (8), return over the left parietal protuberance, over the right angle of the lower jaw, and redescend to the chin (9), in such a way as to have three vertical obliques behind each angle of the jaw and six obliques between the forehead and the summit of the head. From the chin, gain the nape; then make a horizontal circle of the forehead (10), in order to fill all the turns; arrived at the nape, make a circle of the neck (11); then, when this circle shall have reached the nape, conduct the bandage directly beneath the right ear, from thence over the chin, in passing immediately beneath the lower lip (12). Repeat this operation a second time, as for the simple cross (13); then make a semi-circle of the neck (14) so as to gain the left angle of the jaw; ascend again to the forehead, descend obliquely to the nape (15), pass over the left parietal protuberance, the right angle of the lower jaw, under the chin (16), over the left angle of the lower jaw, and ascend again between the forehead and the summit of the head; gain the nape (17), the left parietal protuberance, redescend under the chin (18), and terminate by circular turns around the head (19).

Uses.—This bandage is employed in cases of luxation or of double fractures of the body and neck of the lower jaw. Applied as we have just described it, this bandage is much more

complicated, but much more durable, than that recommended by Thillaye.

SECOND VARIETY, WITH THE DOUBLE ROLLER.

(PLATE 3, FIGURE 10.)

Composition.—A bandage twelve yards long, one and a half to two inches broad, rolled into two heads of unequal size.

Application.—After having applied the face of the bandage intermediate between the two rollers over the middle of the forehead (1, 1'), direct the rollers obliquely above the ears so as to descend to the nape, where you will intercross them in changing them from hand to hand; from thence carry them under the chin (2'), where you will intercross them by simply passing one below the other, so as to mount to the right and the left in covering the angles of the lower jaw, as far as the anterior and superior part of the forehead, where you will intercross them anew by reversing the superior (2, 2'); then carry each of the two rollers to the nape in making the inferior bandage pass between the right parietal protuberance and the ear (3') and the bandage which has been reversed over the left parietal protuberance. At the nape, intercross each roller a second time so as to return under the chin (3); ascend over the angles of the lower jaw, intercross them over the forehead (4', 4'), and redescend to the nape (4); from the nape return a third time under the chin (5'), over the angles of the lower jaw, the forehead, and again to the nape (5, 5), in acting as we have indicated. Arrived at this point, leave the bandage which ought to make the reverse in repose, and make with the one which covers it a circle around the forehead (6), in order to inclose on each side the six obliques; then, when the circular shall have returned to the nape, make the reverse, and direct the two rollers simultaneously in front of the chin, in order to embrace it; these, in order to avoid puckering, reverse the inferior bandage over the superior. From the chin, direct each roller towards the nape, intercross them, gain the under part of the chin (8), the angles of the jaw, the forehead, and again the nape (8', 8); repeat a second time the same manœuvre (9', 10, 10); and terminate by stopping the roller (11') with the roller (11), which should make several circular turns around the head, in order to secure all the circumvolutions.

Uses.—They are the same as those of the preceding bandage. The double cross for the jaw with two rollers is still more solid than that applied with one roller, but it is necessary to employ a great deal of care in its application which is excessively difficult.

CROSS FOR THE HEAD.

(PLATE 3, FIGURE 11.)

Composition.—A bandage six yards long, by one and a half to two inches broad.

Application.—If the bandage is to be applied over the right temple, make two horizontal circular turns around the forehead, placing the initial end above the right eyebrow (1, 2); arrived behind the right ear, secure the turn with a pin, and make a reverse with it from above-downwards (3), in order to direct the bandage under the chin. From thence mount by passing over the left ear to the vertex, descend to the right, covering half of the reverse, regain the under part of the chin (4), so as to make in the same manner three or four vertical circles, or even more, if necessary (5, 6, 7, 8). When the parts are sufficiently covered, secure the last vertical circle in front of the temple with a pin, then make a second reverse (9), in order to direct the bandage towards the opposite temple, and maintain the whole by horizontal circular turns around the forehead.

Uses.—This bandage is very convenient; it is frequently employed to maintain topical applications in diseases of the ear, of the parotid gland, and of the submaxillary and suprahyoid regions.

KNOTTED BANDAGE FOR THE HEAD—(BALER'S KNOT.)

(PLATE 4, FIGURE 12.)

Composition.—A bandage ten yards long by one and a half to two inches broad, made into two rollers of unequal size.

Application.—Apply the face of the bandage horizontally over the diseased temple, the left temple for example; direct the two rollers towards the right temple (1, 1') where you will intercross them by reversing the superior over the inferior, then bring them back over the diseased temple (2, 2'),

these form an ear by twisting one over the other, and changing their direction in such a manner that one may be directed under the chin (3') and the other over the summit of the head (3), from whence they will come to be intercrossed again over the right temple, to gain a second time the under surface of the chin, the summit of the head and the left temple (4, 4'). Form then a second ear like the first, but in an inverse sense, that is to say by directing the rollers horizontally, the one over the forehead and the other over the nape (5, 5') as far as the right temple, from whence, after having intercrossed them, they will be brought back over the left temple (6, 6') to make there a third ear like the first (7, 7'), make then a fourth ear like the second and terminate by horizontal circular turns around the forehead with the aid of the largest roller.

Uses.—This bandage is recommended for exerting compression in the case of lesion of the temporal artery; its action is aided by placing on each side of the wound a small graduated compress (A, B). Destined to remain in place until the obliteration of the artery and to be tighter than any other of the head, it must be applied with care and watched attentively in order to avoid the accidents which too great a compression might occasion.

RECURRENT FOR THE HEAD—(CAPELINE.)

(PLATE 4, FIGURE 13.)

Composition.—A bandage eight yards long by one and a half to two inches broad, made into two unequal rollers.

Application.—Apply the face of the bandage over the anterior part of the forehead (1, 1'), direct the rollers above the eyebrows and the ears in descending obliquely to the nape where you will intercross them by reversing the inferior over the superior, in such a way as to bring the first from the occiput to the root of the nose (2) in passing over the summit of the head, following the track of the sagittal suture (the name *recurrent* is given to this turn of the bandage). Then make with the second a horizontal semi-circle of the forehead (2) in order to fix the reversed turn. Thus fixed, this is raised up over the circular to make a second recurrent which you will direct this time from the forehead to the nape in going from left to right and in covering the first for the third of its breadth (3); fix to the nape this second recurrent by a

horizontal semi-circle, make a third reversed turn towards the forehead in directing it from right to left (4) and fix it by a horizontal semi-circle (3'). Continue thus, and make successively from left to right and from right to left reversed turns from the forehead to the nape and from the nape to the forehead, in taking care to dispose them in the form of slices of melon and to secure them by circular turns until the head is completely covered (5, 6, 7, 8, 9, 10, 11, 5' 6'), then terminate the bandage by two or three horizontal circular turns with the aid of the roller (7').

Uses.—Recourse is had to this bandage in case of wounds of the scalp, to support the sutures or topical applications to this region. It is a very elegant bandage, but is rarely used, because in order to give solidity it is necessary to apply it very tightly.

The recurrent of the head may also be executed with a single roller; this variety does not differ from the other except in the manner of maintaining the reverses. We will describe it in detail when we come to consider the bandages for amputation, for which it is more particularly employed.

DOUBLE T FOR THE NOSE.

(PLATE 4, FIGURE 14.)

Composition.—A bandage two yards long and one and a quarter inches wide, to the middle of which is sewed perpendicularly, and at the distance of one and a quarter inches one from the other, two other bandages half a yard long and four-fifths of an inch broad.

Application.—Apply over the upper lip the portion of the transverse bandage between the two perpendicular ones, and conduct each extremity, passing below the ears (B, 1, 1'), to the nape, where you will confide them to an assistant, after having intercrossed them; then carry obliquely as far as the root of the nose the two perpendicular bands, cross them, carry them over the forehead (A, A), the summit of the head, leaving between them an interval of one and a quarter inches. From the summit of the head direct them towards the nape, when you will secure them by a knot, after having passed them the one beneath, the other above the transverse band. Then take the two rollers of the latter (B², B²), from the hands of the assistant, and bring them around the forehead,

to be secured by a pin after making one or two horizontal circular turns.

Uses.—This bandage is used to sustain the dressings after a rhinoplastic operation, or for the treatment of fracture of the bones of the nose proper.

INVAGINATED OR UNITING BANDAGE FOR VERTICAL WOUNDS OF THE LIP.

(PLATE 4, FIGURE 15).

Composition.—1st. A bandage three yards long and four-fifths of an inch wide, made into a double roller. 2d. A long, double compress, one and a half yards long and two and a half inches broad. 3d. Two graduated prismatic compresses, two and a half inches long and one and a half inches broad, and having a thickness of from two and half to three inches, according to the greater or less saliency of the cheeks.

Application.—Place the graduated compresses (B, B) in the hollow below the cheek-bone, half an inch from the labial commissures; have them held by an assistant who, placed behind the patient, approximates them as much as possible without deranging them, in such a manner as to relax the upper lip; then apply the centre of the long compress over the summit of the head, bring the extremities under the chin in passing over the graduated compresses, and have them held temporarily by the hand of an assistant or of the patient. Apply then the centre of the double roller bandage over the forehead (1, 1'), direct the two rollers to the nape, from whence, after having intercrossed them and changed hands, you will bring them back in passing above the long compress and the graduated compresses which the assistant then ceases to hold, over the upper lip, at the centre of which one of the rollers will pass through a transverse slit previously made in one of the bandages (2, 2'); then draw with sufficient force upon the rollers, carry them back to the nape to be intercrossed again, and bring them back a second time in front of the upper lip (3, 3'), then to the nape where you will confide them to an assistant. That done, take hold yourself of the ends of the long compress, cross them under the chin; carry them, in covering on both sides the bandages and graduated compresses to the vertex, where you will intercross them once more in order to fix them over the temples by means of pins;

then take hold again of the two rollers at the nape, carry them around the forehead, and terminate by several horizontal circular turns.

Uses.—This bandage is resorted to to aid the action of sutures in approximating the edges of wounds of the upper lip, whether after a traumatic lesion, or after the operation for hare lip.

BANDAGES FOR THE TRUNK.

FIGURE OF EIGHT FOR ONE SHOULDER AND THE OPPOSITE AXILLA—(SPICA FOR THE SHOULDER.)

(PLATE 5, FIGURE 16.)

Composition.—A bandage eight yards long and two inches broad.

Application.—Place the initial end (1) about the middle of the injured arm—the right for example—and secure it by two or three circular turns (2, 3); arrived at the posterior and internal part of this member, ascend behind the shoulder so as to reach its superior part; from thence descend to the axilla of the sound side, by passing obliquely in front of the chest (4), ascend obliquely behind the back, gain the superior part of the diseased shoulder, and descend under the axilla of the same side, crossing the first turn (5, 5). Ascend again over the shoulder, re-descend to the sound axilla, ascend again behind the back, over the diseased shoulder; re-descend under the axilla of this side, and continue to act thus (8, 9, 9, 10, 10, 11, 11, 12, 12, 13, 13, 14) until the bandage is exhausted, when the terminal end is to be secured to one of the turns, either on the anterior or posterior aspect of the chest. Thus applied, this bandage constitutes the *descending spica*, because the turns of the bandage cover each other from above downwards, from the upper part of the shoulder to its lower; it may be applied in an inverse sense, or from below upwards; it then takes the name of *ascending spica*. The first appears to us preferable, being firmer and more regular.

Uses.—This bandage serves to confine applications to the upper portion of the sternum, over the clavicle and the summit of the shoulder.

ANTERIOR FIGURE OF EIGHT FOR THE SHOULDERS.

(PLATE 5, FIGURE 17.)

Composition.—A bandage eight yards long and two inches broad.

Application.—Fix the initial end (1) by two circular turns at the upper part of the right arm (2, 3); having reached the internal and posterior part of this member, mount behind the right shoulder and gain its superior part; then guide yourself obliquely in front of the chest, so as to descend under the left axilla, (4, 4), ascend behind it, thence over the shoulder, and descend, crossing the first turn, under the right axilla (5, 5). Now mount again over the shoulder of this side, pass obliquely in front of the chest, come under the left axilla (6, 6), over the shoulder, in front of the chest to reach the right axilla by crossing the preceding turns (7, 7), and continue thus until there is a sufficient number of crosses in front of the sternum (8, 8, 9, 9, 10). Finish the bandage by securing the terminal end indifferently over the one or the other shoulder.

Uses.—This bandage serves to preserve contact of the fragments of the sternum in fractures of the upper part of this bone; it is also employed to dress burns between the shoulders, in order to prevent bad cicatrization; lastly, it will serve to maintain reduced luxations of the internal end of the clavicle forwards. In the two latter circumstances, its object is to draw the shoulders forward; it is therefore necessary to place them in this position before commencing it, and to maintain them so by the aid of an assistant during the whole of its application. It is useful, in order to prevent the inconvenient pressure exerted in front and especially behind the axilla, to protect these parts with wadding.

CROSS FOR BOTH GROINS—(SPICA FOR BOTH GROINS.)

(PLATE 6, FIGURE 18.)

Composition.—A bandage fourteen yards long and two and a half inches broad.

Application.—Make first, from before backwards and from right to left, two or three horizontal circular turns around the abdomen (1, 2, 3); having arrived above the crest of the

right ilium, take an oblique direction towards the left groin, and gain the external face of the thigh of the same side (4, 4, 4); pass behind it, come to its internal side, mount over by passing over the left groin to above the left trochanter major (5, 5); make behind a semi-circle of the abdomen; arrived over the right trochanter major, descend in covering the right groin to the internal part of the corresponding thigh (6, 6); wind behind it, and ascend obliquely towards the crest of the left ilium (7, 7, 7); practise a posterior abdominal semi-circle; then, from the right iliac spine, gain the external part of the left thigh (8, 8, 8); get to its internal side, ascend to the left trochanter major (9, 9), practise a posterior abdominal semi-circle, pass over the right trochanter major, descend obliquely to the internal part of the thigh of the same side (10, 10), get to its external face, and ascend over the left iliac spine (11, 11, 11); continue in this way until the groins are sufficiently covered (12, 12, 12, 13, 14, 14, 15, 15), then terminate with the roller (16) by circles around the abdomen.

Instead of making the cross in this way by ascending (*ascending spica*), it may be executed, as in the succeeding case, by working it from above downwards (*descending spica*).

The *spica* for both groins may be also applied with a double-headed roller. For this purpose the centre of the bandage is placed over the last lumbar vertebræ, and after having made two or three circular turns around the abdomen, crossing the turns alternately in front and behind, one of the rollers is directed from right to left and the other from left to right towards the iliac spines; from thence the external face of each thigh is gained, crossing the bandage above the pubis. Wind round the posterior face of each thigh and gain their internal side; ascend, passing obliquely over the groins, to the great trochanters, and, after having crossed the bandage over the loins, direct the rollers again towards the iliac spines, to descend again towards the external face of the thighs, reascend over the groins, gain the loins, and continue thus the number of turns necessary to cover the injured regions. The cross for both groins, with the double roller, does not compensate by any advantage the difficulties of its application; it is with much trouble, and only by subjecting the patient to painful movements, that we can make the crossing over the

sacro-lumbar region; we, therefore, think that the single-headed roller should always be preferred.

Uses.—The spica for both groins answers the same purposes as the preceding when both groins are to be acted on.

CROSS FOR THE GROIN—(SPICA FOR THE GROIN.) •

(PLATE 6, FIGURE 19.)

Composition.—A bandage nine yards long and two and a half inches broad.

Application.—The spica may be applied either to the left or right groin. If you wish to cover the latter, begin from right to left of the patient, by making two or three horizontal circular turns around the abdomen (1, 2, 3); then, after having made the bandage pass over the space included between the great trochanter and the crest of the ilium, direct it obliquely towards the internal part of the corresponding thigh (4, 4); from there pass to its posterior part, following the fold of the buttock, gain its external part, and ascend obliquely, crossing over the first turn of the bandage, towards the great trochanter of the left side (5, 5). Make a horizontal half-circle behind the abdomen, bring back your bandage between the great trochanter and the crest of the right ilium, gain obliquely the internal part of the thigh in covering the first turn of the bandage for two-thirds of its width (6, 6), make a contour with the bandage by its posterior face, come over its external face, and ascend obliquely over the great trochanter of the left side (7, 7); make a new contour of the abdomen behind, redescend to the internal part of the right thigh, mount again over the great trochanter of the left side, make a third posterior abdominal circle, and continue thus as often as may be necessary for covering the right groin completely (8, 8, 9, 9, 10, 10, 11, 11, 12, 12, 13, 13, 14, 14, 15, 15, 16, 16, 17, 17). Finish, lastly, with the roller (18) by circular turns around the trunk.

Uses.—This bandage may be employed for maintaining topical applications and all sorts of dressings over the groin; it is, nevertheless, generally reserved for those circumstances in which it is necessary to exert a solid and regular pressure over this region, when there is question, for example, of compressing engorged glands, producing pressure upon fistulous tracts, maintaining a hernia, etc.; in these different cases it

is necessary to interpose round, oval or square graduated compresses between it and the points of compression.

Thus applied, this bandage constitutes the *ascending spica*. The *descending spica* is executed by, instead of directing the first oblique towards the point where you wish the bandage to stop below, placing it at the superior part of the thigh, and continuing the crosses from above downwards. These two modes of application of the spica for the groin may be indifferently employed; there is no reason, that we can perceive, for preferring the one over the other.

BANDAGES FOR UPPER EXTREMITIES.

SPIRAL FOR ONE FINGER.

(PLATE 7, FIGURE 20.)

Composition.—A bandage one and a half yards long and about an inch wide.

Application.—If you wish to cover one of the fingers of the right hand, after having placed the hand in a state of pronation, leave several inches of the initial end hanging on the ulnar side of the wrist, and make two or three circular turns around it (1, 2); having arrived at the articulation of the fifth metacarpal bone with the unciform, descend obliquely towards the external side of the base of the finger (3, 3), make several digressing turns to gain the end of the finger (4), from whence you will ascend to its base by making successive turns covering each other for two-thirds of their width (5, 6, 7, 8, 9, 10, 11); then, when the last turn shall have reached the internal side of the finger, pass over the back of the hand, wind round the first metacarpal bone about its middle (12), and reach the ulnar side of the wrist (13), where you will tie the initial and terminal ends together (14, 15).

Uses.—This bandage serves to exercise compression and maintain dressing around the finger.

SPIRAL FOR THE FINGERS AND HAND.

(PLATE 7, FIGURE 21.)

Composition.—A bandage three yards long and one and a half inches wide.

Application.—Fix the initial end at the extremity of the fingers (1, 2); ascend from thence towards the wrist, making, at the base of the thumb, proper reverses, so as to give to the

bandage sufficient solidity and regularity (3, 4, 5, 6, 7, 8, 9, 9, 10, 10, 11, 11, 12, 12, 13, 13, 14, 14, 15, 15), and finish by circular turns around the wrist (16, 17, 18).

Uses.—The spiral of the fingers and hand serves to maintain the apparatus in fractures and luxations of the fingers and bones of the hand.

FIGURE OF EIGHT FOR THE THUMB AND WRIST—(SPICA FOR THE THUMB.)

(PLATE 7, FIGURE 22.)

Composition.—A bandage two yards long and four-fifths of an inch broad.

Application.—After having placed the hand in a state of semi-pronation, allow to hang on the ulnar side of the forearm, if it is the right wrist and thumb that you wish to cover, several inches of the initial end, gain the radial side of the wrist, and make one or two circular turns around it (1, 2, 3); having reached the upper extremity of the fifth metacarpal bone, descend obliquely towards the external side of the articulation of the first with the second phalanx of the thumb (4, 4), come to its internal side and ascend, crossing the first turn, to the internal side of the lower extremity of the first metacarpal bone (5, 5); then make a horizontal semi-circle over the palmar surface of the wrist, so as to bring the bandage over the carpal articulation of the fifth metacarpal bone; from thence gain obliquely the external face of the second phalanx of the thumb, covering the oblique (4) two-thirds (6, 6); come again to the internal side of this phalanx, and ascend a second time obliquely towards the middle and external side of the first metacarpal bone (7, 7); go again over the palmar face of the wrist, redescend to the external part of the base of the thumb (8, 8), ascend again over the lower extremity of the first metacarpal bone (9, 9), make a third semi-circle of the wrist; then, after having continued the obliques around the thumb until its metacarpo-phalangeal articulation is completely covered (10, 10, 11, 11, 12, 12, 13, 13, 14, 14, 15, 15), come again to the ulnar side of the forearm, where you will tie together the terminal end (16) with the initial end.

Uses—This bandage is used in the dressing of lesions of the metacarpo-phalangeal articulation of the thumb; it is

farther useful to secure extension of this member after reduction of the luxation backwards of the first metacarpal bone from the trapezium. Like all the spicas, it may be applied from above downwards; that is to say, in directing the crosses from the base towards the summit of the thumb; but this *descending spica* is much less regular than the *ascending spica*, which we have just described.

POSTERIOR FIGURE OF EIGHT FOR THE HAND AND WRIST.

(PLATE 7, FIGURE 23.)

Composition.—A bandage two and a half yards long and one and a half inches wide.

Application.—Place the hand in a state of pronation, and fix the initial end of the bandage over the dorsal aspect of the wrist by a horizontal circular turn (1, 2), following the direction from the radius to the ulna, if the bandage is applied to the left hand, then carry the roller obliquely over the back of the hand; from thence conduct it, after having made a horizontal circular turn around the fingers (4), between the thumb and the index finger, from whence you will ascend obliquely over the back of the hand (5, 5), crossing the turn (3); make a horizontal circle around the wrist (6), repass obliquely over the back of the hand (7, 7,) circularly around the base of the fingers (8), come again between the thumb and the index finger, to ascend anew obliquely over the back of the hand (9), and, after having continued thus until the bandage is exhausted, terminate by circular turns around the wrist (10).

Uses.—Recourse is had to this bandage for maintaining the apparatus over the dorsal aspect of the hand and wrist; it may equally serve to fix a graduated compress, destined to exercise compression, whether over a ganglion or over the os magnum, after reduction of its luxation backwards, or over the salvatella, to arrest the flow of blood after bleeding from this vein.

ANTERIOR FIGURE OF EIGHT FOR THE HAND AND WRIST.

This bandage may be executed like the preceding one, but in making the crosses over the palmar face of the hand,

which, in the posterior eight, are made over the dorsal aspect. It serves to apply dressings to the palm of the hand.

FIGURE OF EIGHT FOR THE ELBOW—(BANDAGE FOR VENESECTION FROM THE ARM.)

(PLATE 8, FIGURE 24.)

Composition.—A bandage two and a half yards long and one and a half inches broad.

Application —Leave a tail of bandage, ten inches long, free over the external and lower side of the right arm; then, after having directed it towards the internal side, fix it by a circular turn (2); having arrived above the external condyle, gain obliquely the internal and upper side of the fore-arm (3), surround it with a horizontal circle (4), and ascend obliquely, in crossing in front of the bend of the arm, the turn (3), as far as the internal condyle (5); make a horizontal semi-circle backwards, pass again over the fold of the arm (6), circularly behind the fore-arm; mount again obliquely towards the internal condyle (7), and terminate by tying the terminal end (8) and the initial end together on the outside of the arm.

Uses.—The eight bandage for the elbow is in daily use to secure the small compress placed over the vein after venesection from the arm; its circumvolutions leave full liberty of motion to the elbow, and allow it to be maintained in a semi-flexed position until the healing of the wound.

FIGURE OF EIGHT FOR EXTENDING THE HAND UPON THE FORE-ARM.

(PLATE 8, FIGURE 25.)

Composition.—A bandage, five yards long and one and a half inches broad, made into a double-headed roller.

Application.—After having placed the hand in the extended position, apply the intermediate face of the bandage over the dorsal aspect, then direct the two rollers towards the palmar face (1, 1'), where you will cross them, changing them from hand to hand; from there bring them back over the dorsal aspect, where you will cross them anew (2, 2'), so as to conduct them and cross them again over the palmar surface; direct them then obliquely the one above the external condyle (3, 3'), the other above the internal condyle (3' 3'),

crossing them, like the letter X, at the middle of the fore-arm, make a horizontal eirele with your two rollers above the elbow (4, 4'); come again above the external and internal condyles, deseend obliquely towards the hand, erossing the turns again, like the letter X, at the middle of the fore-arm (5, 5, 5', 5'); cross your bands over the palm of the hand (6, 6'), and finish by aseending towards the elbow and deseending towards the hand until the bandage is exhausted.

Uses.—This bandage is employed, in the ease of burns of the palmar aspect of the hand and wrist, to prevent flexion of the parts from contraction of the cicatriees.

FIGURE OF EIGHT FOR FLEXING THE HAND UPON THE FORE-ARM.

When the burns are situated upon the baek of the wrist or hand, if you wish to prevent contraction of the eieatriees from producing extension of the hand upon the fore-arm, the flexing figure of eight for the hand must be resorted to. In order to apply it, the hand is plaeced in the flexed position, and the intermediate face of the bandage between the two rollers is plaeced over the palmar surfaee; the two rollers are then directed towards the dorsal aspect, then again towards the palm, from the hand towards the elbow and from the elbow towards the hand, alternately representing the letter X over the middle of the anterior surfaee of the fore-arm.

RECURRENT OR CAPELINE FOR DISARTICULATION OF THE SHOULDER-JOINT.

(PLATE 8, FIGURE 26.)

Composition.—A bandage twelve yards long and one and a half inehes broad, made into a double-headed roller.

Application.—Place the face of the bandage intermediate to the two rollers under the axilla of the sound side, then eonduet each roller above the upper part of the wound going obliquely from below upwards, one behind, the other in front of the chest (1, 1'); arrived there, change them from hand to hand for the purpose of erossing them; gain, from before baekwards with the one held in the right hand, the posterior and inferior part of the wound (1'), eonduet at the same time the one in the left hand under the sound axilla, turn the lat-

ter, and come to fix inferiorly by a horizontal circular turn of the chest the first oblique or recurrent turn (1' 1') (2 2); then raise the latter, and after having embraced in the form of a loop the turn (2), direct it obliquely from below upwards towards the superior part of the wound (2'), where you will fix it with the turn (3) which you will have conducted over it in parting from and returning towards the sound axilla after having covered successively from below upwards and from above downwards the posterior and anterior walls of the thorax (3, 3). Make now a third descending recurrent (3'), fix it by a second horizontal circle (4), then practice a fourth ascending recurrent (4'), over which you will pass anew a turn parting from and returning towards the sound axilla (5). Continue thus until the wound and dressings have been completely covered (5', 6, 6, 7, 7', 8, 8', 9, 9', 10, 10', 11, 11'), and terminate by making horizontal circular turns around the chest with the roller (12).

Uses.—This bandage, as simple as elegant, is very convenient for maintaining topical applications or apparatus, after disarticulation at the shoulder-joint.

OBLIQUE SLING FOR THE ARM AND CHEST.

(PLATE 9, FIGURE 27.)

Composition.—A piece of linen one yard square, folded diagonally into a triangle.

Application.—The fore-arm being bent at a right angle upon the arm, place the base of the triangle under the hand (A), directing the apex towards the elbow, then make the ends ascend obliquely, the one in front (B) the other behind the chest to the sound shoulder where you will tie them together (C); gather up the angles at the apex and carry them, embracing the arm and elbow (D, E, G, H), in front of the chest to be secured by a pin to the body of the bandage (F).

Uses.—This sling may be applied over the dress—it supports the arm and fore-arm perfectly.

SIMPLE AND DOUBLE T FOR THE HAND.

(PLATE 9, FIGURE 28.)

Composition.—A bandage about three-quarters of a yard long and a little over an inch broad (A, A, minor figure 28),

upon which will be sewed perpendicularly two other bandages, a little shorter and proportionably narrower, one about two and a half inches from the initial end (C, minor fig. 28), and the other at nearly twice the distance from the same end (B, minor figure 28). For the simple T the two supplementary bands will be replaced by a single one which will be sewed perpendicularly upon the transverse band, but at the distance of about four and a half inches from the initial end.

Application.—If you wish to apply the *double T*, place the initial end of the transverse band over the back of the wrist in such a manner that the two perpendicular bands correspond to the interdigital spaces of the fourth and fifth and the first and second fingers (A^1, A^2, B^1, C^1 , figure 28); conduct this latter one between the thumb and the index (C^1) the other between the ring and the little finger (B^1), then direct them towards the palmar face of the wrist, where you will fix them by passing the transverse band circularly around them (A^4); from thence bring them back to the back of the wrist, traversing with the one the third (B^2), and with the other the second interdigital space (C^2). Fix this latter by a horizontal circular turn (A^4), reverse it in the form of an ear (C^2) over this circular, proceed to tie it over the back of the wrist with the first (B), and finish by fixing the terminal end of the transverse band with a pin (A^5). The *simple T* is applied in the same manner, but only two interdigital spaces are covered with the perpendicular band.

Uses.—The double T retains more firmly than the simple T dressings over the back and palm of the hand; both serve to prevent union between the fingers, so apt to take place in the cicatrization from burns. The simple T acts only upon two, while the double T acts upon the four interdigital spaces.

BANDAGES FOR LOWER EXTREMITIES.

SPIRAL FOR THE LOWER LIMB—(THE DEN'S BANDAGE.)

(PLATE 10, FIGURE 29.)

Composition.—A bandage sixteen yards long and two inches broad.

Application.—If you wish to apply this bandage over the right limb, begin at the base of the toes, making a certain number of turns, interrupted by the necessary reverses (1, 2, 3, 4, 5, 6, 7, 8). Having reached the instep, direct your bandage obliquely over the summit of the heel (9), then again over the instep, from whence you will come, passing under the sole, to cover, in front of the heel, the anterior border of the preceding turn (10); then gain, obliquely, the upper part of the tibio-tarsal articulation (10, 10), pass behind the tendo-Achillis, and cover, on the back of the heel, the posterior border of the band 9 (11). From this point, gain obliquely the instep (11, 11), pass circularly over the plantar surface and gain, for the fourth time, the instep, in order to cross at this point the preceding turn (12). From the instep, direct yourself over the internal malleolus, behind the tendo-Achillis, pass from behind forwards and transversely under the external malleolus (13), under the sole of the foot, and ascend over the instep, in order to proceed from there to cross from before backwards over the tendo-Achillis the turn 13 (14, 14); from the tendo-Achillis come again over the instep, pass over the plantar surface (15), cover from before backwards and transversely the under part of the internal malleolus, then surround the leg circularly (16, 17, 18, 19). That done, proceed with circular and reversed turns to the lower border of the patella (20, 20, 21, 21, 22, 22, 23, 23, 24, 24, 25, 25, 26, 26, 27, 27, 28, 28, 29, 29,

30, 30, 31, 32, 33, 34, 35), which you will cover by the aid of superior and inferior crosses. To do this, direct your bandage obliquely from below upwards from the upper and outer part of the leg towards the summit of the internal tuberosity of the tibia (36), surround the back of the knee, and after having covered the external tuberosity of the tibia, gain obliquely, by crossing the preceding oblique below the patella, the upper and internal part of the leg (37); repeat this operation two or three times (38, 39, 40, 41, 42), then gain, by crossing obliquely the popliteal space, the outer and lower part of the thigh, which you will surround with a horizontal circular (43). Having reached the outer and lower face of the thigh, descend obliquely towards the internal condyle of the femur (44), cover the knee behind, pass over the external femoral condyle and gain, by crossing obliquely from below upwards above the patella the turn (44), the inner and lower face of the thigh (45). Make, in this way, two or three crosses (46, 47, 48, 49, 50), then unite them to the inferior crosses by the aid of a turn which, from the ham, will pass circularly over the patella (51), and ascend behind to the lower and outer part of the thigh. Having reached these, finish your bandage by the aid of new circular and reversed circumvolutions covering the whole upper surface of the thigh (51, 52, 53, 54, 55, 56, 56, 57, 57, 58, 58, 59, 59, 60, 60, 61, 61, 62, 62, 63, 63, 64, 64, 65, 65, 66, 66, 67, 67, 68).

Uses.—The spiral of the lower limb employed with success by Professor Velpeau in the first stage of diffuse phlegmon to obtain resolution of the inflammation and disengagement of the tissues, is often useful for emptying purulent depots and facilitating adhesion in the parts after long and abundant suppurations. It is also used for varicose veins, œdema, and especially for producing compression throughout the whole extent of a limb when it is desired to treat aneurismal tumor by this means. Generally designated under such circumstances as *Theden's bandage*, it is used with a view to compress the diseased points, to prevent the engorgement of parts situated below, and to modify the flow of blood to the tumor; to achieve the latter result, Theden, before applying the bandage, placed graduated compress over that portion of the artery situated above the aneurism, and covered the tumor with cloths saturated with his astringent wash, called *eau d'arquebuse*.

The spiral of the lower limb works loose and becomes easily deranged; it is moreover very fatiguing on account of the compression it produces, and which may determine gangrene when it is not evenly applied. These inconveniences are obviated by remedying the inequalities of the limb with wadding or tow, and securing the circumvolutions by the application of starch.

FIGURE OF EIGHT FOR THE LEG AND FOOT.

(PLATE 10, FIGURE 30.)

Composition.—A bandage two and a half yards long and two inches broad.

Application.—Place the initial end three or four fingers breadth above the malleoli, over the anterior part of the leg, and fix it by a horizontal circular turn (1, 2); arrived above the internal malleolus, gain obliquely the articulation of the fifth metatarsal with the cuboid bone (3), surround the sole and back of the foot by a horizontal circular (4) and ascend obliquely, crossing over the instep the preceeding turn, to the external malleolus (5); make behind the leg a horizontal semi-circle, cover the instep again obliquely (6) and the plantar surface circularly, then ascend again over the external malleolus (7); continue thus until the small compress which you have previously placed over the vein is firmly fixed, and finish by horizontal circular turns around the leg with the roller (8).

Uses.—This bandage may be used for maintaining dressings over the dorsal and plantar aspects of the foot, and also over the tibio-tarsal articulation, but is more particularly resorted to for compressing the opening in the saphenous vein after bleeding from the foot.

POSTERIOR FIGURE OF EIGHT FOR THE KNEE.

(PLATE 10, FIGURE 31.)

Composition.—A bandage four yards long and two inches broad.

Application.—Fix the initial end by a horizontal circular turn above the knee (1, 2); having arrived above the external condyle of the femur, descend obliquely behind the ham to the internal tuberosity of the tibia (3); surround the upper

part of the leg with a horizontal circle (4), then ascend obliquely, crossing like the letter X over the popliteal space the preceding oblique, as far as the internal condyle of the femur (5); make a horizontal semi-circle over the anterior and lower part of the thigh, pass again obliquely over the ham (6), circularly over the anterior and upper part of the leg, ascend again over the internal condyle of the femur (7), and continue thus to the entire expending of the bandage (8).

Uses.—This bandage is employed for dressings over the ham; it may be also used for compressing the popliteal artery affected with spontaneous or traumatic aneurism.

RECURRENT OR CAPELINE FOR AN AMPUTATED THIGH.

(PLATE 11, FIGURE 32.)

Composition.—A bandage twelve yards long and about two inches broad.

Application.—The amputation terminated, the wound covered with lint, and this sustained by a compress, shaped like a Maltese cross, fix the initial end above the stump by several horizontal circular turns (1, 2, 3, 4); arrived over the external side of the thigh (we suppose it to be the right), reverse the bandage from above downwards (5), so as to make a turn descend over the wound, cover it across and ascend over the opposite side of the limb (6, 6, 6). That done, practise a second reverse, but this time from left to right and from before backwards, which will permit you to cover circularly, in fixing the two reverses, the posterior, external and anterior aspects of the thigh (7, 8, 9). Having reached the middle part of the latter, make a third reverse in the direction of the first (10), then a second recurrent, which you will conduct, by crossing the recurrent (6) at a right angle over the middle of the stump, to the posterior face of the thigh (10); then practise, from right to left, a fourth reverse and two circulars (11, 12); then, when you shall have arrived at the outer side of the third reverse (10), commence a fifth reverse (13) and a third recurrent, which will cover two-thirds of the second on the outside, and like it will be directed from the front to the posterior of the wound (13); maintain this anew by two circular turns (14, 15), and continue in this way your circulars and recurrences alternately until the stump is entirely covered (16, 16, 17, 18, 19, 19, 20, 21, 22, 22, 23, 24, 25).

Finish by ascending and descending turns, if the amputation has been practised at the lower part of the thigh, or by circles around the pelvis, if the limb has been ablated high up, in order to avoid derangement of the apparatus by the movements of the patient.

The capeline for amputations of the thigh may be applied as follows, with the double-headed rollers unequal in their size, the larger serving for the circulars and the smaller for the recurrences.

Place the intermediate face of the bandage over the anterior face of the member above the stump, then direct them over the opposite face, where you will cross them; pass again over the anterior and posterior aspects, making, in this way, three or four circular turns, in order to secure the commencement of the bandage. When the latter reaches one of the sides of the limb, reverse the turn which is above, and conduct it from above downwards, over the most superficial, to form a recurrent, which you will direct transversely over the wound, from the outer to the inner side, if the bandage is applied to the right thigh. Fix this recurrent by a circular turn, then practise a second, which will pass from before backwards, and cross the first over the wound; confine this second recurrent by a circular, continue in this way until the wound is completely covered, and terminate with the most voluminous roller, as we have indicated for the capeline with the single roller.

The latter capeline is almost entirely abandoned because of its application being more difficult than the other; it may, however, be usefully employed in armies; it offers, in effect, much more solidity, an advantage which deserves to be taken into consideration when the patient has to be subjected to rough transportation.

INVAGINATED OR UNITING BANDAGE FOR TRANSVERSE WOUNDS.

(PLATE 11, FIGURE 33.)

Composition.—1st. Two pieces of linen equal in width to the length of the wound, and each as long as the space comprised between the fold of the groin and the lower part of the leg, when the solution of continuity to be re-united is transversely across the anterior region of the thigh. One of these

is to be split at one of its extremities, and about the third of its length, into two or three equi-distant tails; while in the other, at its centre, and in the direction of its length, is made a number of slits equal to the tails of the other. 2d. A bandage eighteen yards long and two inches wide. 3d. Two graduated prismatic compresses made a little longer than the solution of continuity.

Application.—The limb being in a position indicated by the wound, place over the anterior surface of the leg, and following its length, the split piece of linen in such a way that the ends shall be turned upwards and the roots correspond to the wound (A, A^1, A^2); let it be held in this position by an assistant, while you apply a roller bandage around the leg to within two inches of the solution of continuity (1, 2, 3, 4, 4, 5, 5, 6, 6, 7, 7, 8, 8, 9, 9, 10, 10, 11, 11, 12, 13, 14, 15, 16, 17). Then confide the roller to the assistant, and apply the second piece of linen over the anterior portion of the thigh in such a way that the slits shall reach the level of the wound (B, B^1, B^2, C); take the roller from the assistant, in order that he may take charge of the latter piece of linen and secure it by a spiral of the thigh (18, 19, 19, 20, 20, 21, 21, 22, 22, 23, 23, 24, 25, 26, 26, 27, 27). That done, confide again the roller (28) to the assistant, place the graduated compress over the edges of the division (D, D', E, E'), pass the tails (A^1, A^2) through the slits (B^1, B^2), draw them in opposite directions until the edges of the wound are coaptated, and fix the two pieces of linen in this position by a spiral, descending from the upper part of the thigh to the roots of the toes and covering the limb evenly.

Uses.—Although constructed upon good principles, this bandage is rarely used to obtain union in transverse wounds of the limbs, for it can nearly always be replaced by more simple means. Applied over the upper extremities, it serves for the treatment of fractures of the olecranon, and over the lower extremities for fracture of the patella.

TARSO-PATELLA CRAVAT.

(PLATE 12, FIGURE 34.)

Composition.—Three cravats one yard in length.

Application.—Place one of the cravats, in the form of a stirrup, over the instep, and tie its ends together over the

plantar region (H, I, J); fix another over the lower third of the thigh and the upper third of the leg (A, B, B¹, C, C¹, D); then introduce at the instep, under the ring formed by the first (E), a third cravat; carry the ends directly towards the upper and lateral portions of the knee (G, F), and fasten them on each side to the super and sub-patella cravat (G¹).

Uses.—Proposed by M. Mayor for fractures of the patella and rupture of the tendon, which fixes this bone to the tibia, this apparatus will also serve for approximating the lips of transverse wounds of the instep, of the leg, and of the knee.

TRIANGULAR CAP FOR THE STUMP.

(PLATE 12, FIGURE 35)

Composition.—A triangle one yard long from end to end, and half a yard deep from apex to base.

Application.—Place the middle of the base of the triangle over the anterior face of the limb at a convenient distance from the end of the stump (A), direct and cross under the limb the two ends corresponding to this base (B, C), then bring them forward for the purpose of securing them (B¹, C¹); then fold the apex of the triangle over the end of the stump and attach it in front with a pin (D).

The tendency of this cravat to slip and become disarranged when placed over a conical stump may be prevented in the following manner: 1st. *For the thigh*, by means of a band going directly from the apparatus to a band around the waist; or otherwise, by directing the two ends of the handkerchief, after having crossed them in front of the limb, to the waist-band. 2d. *For the arm*, the triangle may be fastened around the neck or the axilla of the sound side. 3d. *For the forearm and the leg*, the two extremities may be carried around the elbow or the knee.

Uses.—This triangle is very convenient for the dressing of amputations; it may advantageously take the place of the numerous turns of bandage required for the application of the capeline.

SCAPULO-TIBIAL OR TIBIAL SLING.

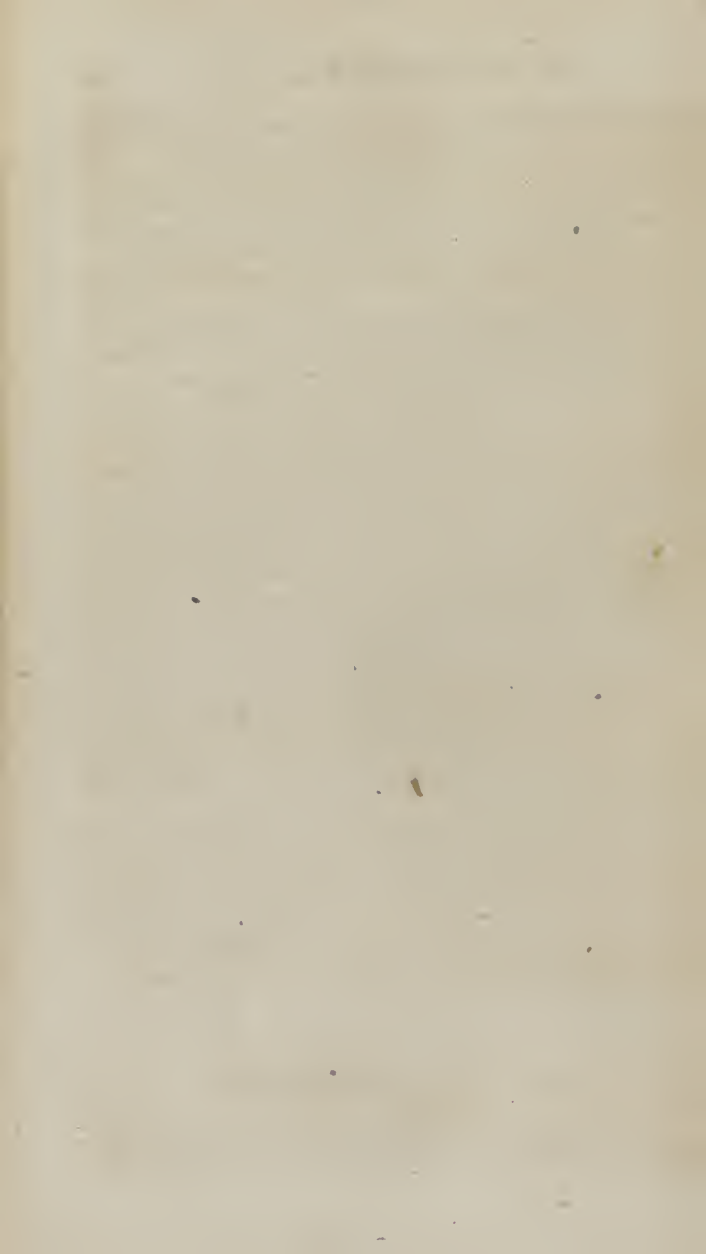
(PLATE 12, FIGURE 36.)

Composition.—1st. A scarf two yards long; a triangle one

and a half yards from end to end and three-quarters of a yard from base to apex.

Application.—Place the base of the triangle over the anterior and inferior portion of the leg (A), take the ends (B), and, after having passed one of them through the ring of the shoulder-band (E, F, G, H,) tie them together at the level of the right or left flank (C), then fold the apex over the side of the knee (D).

Uses.—This sling may be employed in all cases where it is necessary to maintain the leg flexed upon the thigh. It maintains flexion, and at the same time enables the patient to go about.



EXPLANATION OF PLATES.

PLATE 1.

Fig. 1. Manner of commencing the application of the single-headed roller: A, extremity of the thumb, and the index and middle fingers of the right hand, maintaining the roller; B, thumb and index finger of the left hand fixing the initial end.

Fig. 2. Manner of making a reverse: A, left thumb placed over the external face of the band, and assisting to make the fold constituting the reverse.

Fig. 3. Manner of applying a double-headed roller.

PLATE 2.

Fig. 4. Cross for one eye (first variety).

Fig. 5. The same bandage (second variety).

Fig. 6. Cross for both eyes, with one roller.

Fig. 7. The same bandage with the double roller.

Fig. 7 (minor). Manner of making the reverse behind in the application of the double roller in general, and in the cross for both eyes in particular.

PLATE 3.

Fig. 8. Simple cross for the lower jaw.

Fig. 9. Double cross for the lower jaw, with one roller.

Fig. 10. The same bandage with double roller.

Fig. 10 (minor). Manner of making the reverse over the chin in the double cross for the lower jaw, with the double roller.

Fig. 11. Cross for the head.

PLATE 4.

Fig. 12. Knotted bandage for the head (Baler's knot).

Fig. 13. Recurrent or capeline for the head.

Fig. 14. Double T for the nose.

Fig. 15. Invaginated or uniting bandage for vertical wounds of the lip.

PLATE 5.

- Fig. 16. Figure of eight for one shoulder and the opposite axilla.
Fig. 17. Anterior figure of eight for the shoulders.

PLATE 6.

- Fig. 18. Cross for the groins (spica for both groins).
Fig. 19. Cross for the groin (spica for the groin).

PLATE 7.

- Fig. 20. Spiral for one finger.
Fig. 21. Spiral for the fingers and hand.
Fig. 22. Figure of eight for the thumb and wrist (spica for the thumb).
Fig. 23. Posterior figure of eight for the hand and wrist.

PLATE 8.

- Fig. 24. Figure of eight for the elbow.
Fig. 25. Figure of eight for extending the hand upon the elbow.
Fig. 26. Recurrent or capeline for disarticulation at the shoulder-joint.

PLATE 9.

- Fig. 27. Oblique sling for the arm and chest
Fig. 28. Double T of the hand applied.
Fig. 28 (minor). Double T of the hand before its application.

PLATE 10.

- Fig. 29. Spiral for the lower limb (Theden's bandage).
Fig. 30. Figure of eight for the foot and leg.
Fig. 31. Posterior figure of eight for the knee.

PLATE 11.

- Fig. 32. Recurrent or capeline for amputation of the thigh.
Fig. 33. Invaginated or uniting bandage for transverse wounds.

PLATE 12.

- Fig. 34. Tarso-patella cravat.
Fig. 35. Triangular cap for the stump.
Fig. 36. Scapulo-tibial or tibial sling.

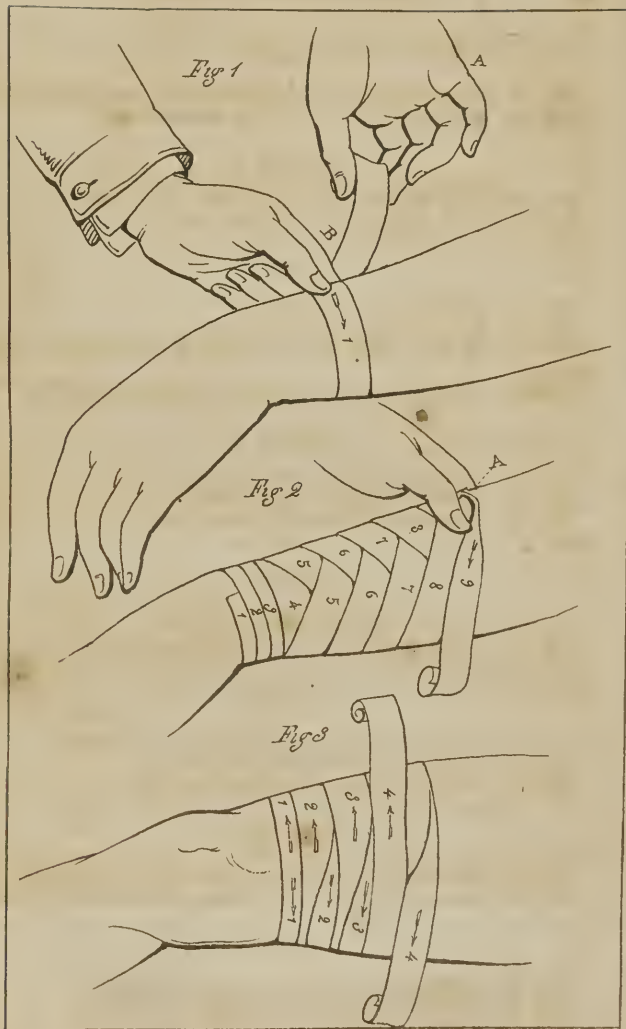


Fig 4

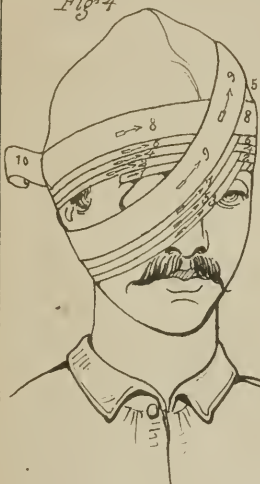


Fig 5

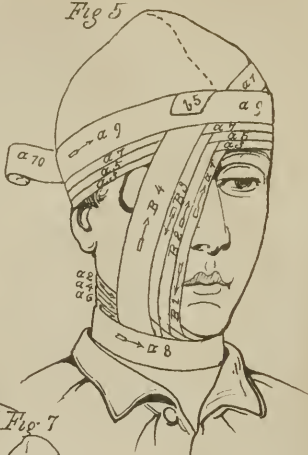


Fig 7



Fig 6

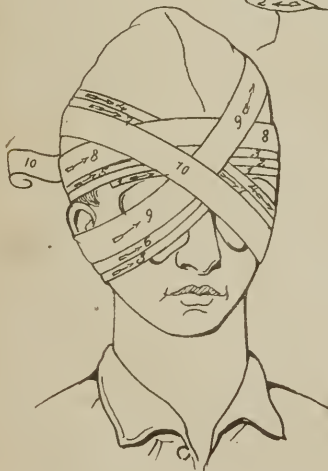


Fig 7



Fig 8



Fig 10

Fig 9



Fig 11

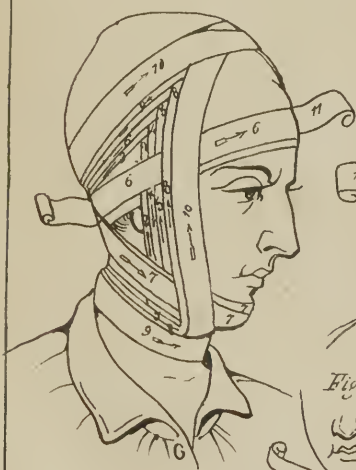


Fig 10

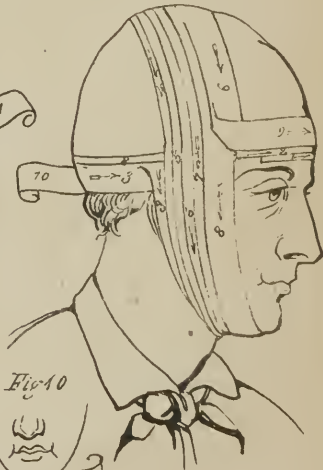


Fig 12

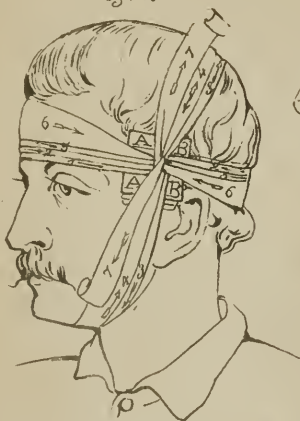


Fig 13

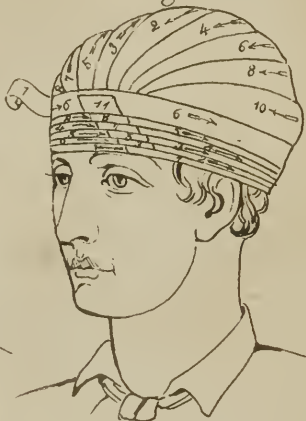


Fig 14



Fig 15



Fig 16



Fig 17



BANDAGES

Fig 19

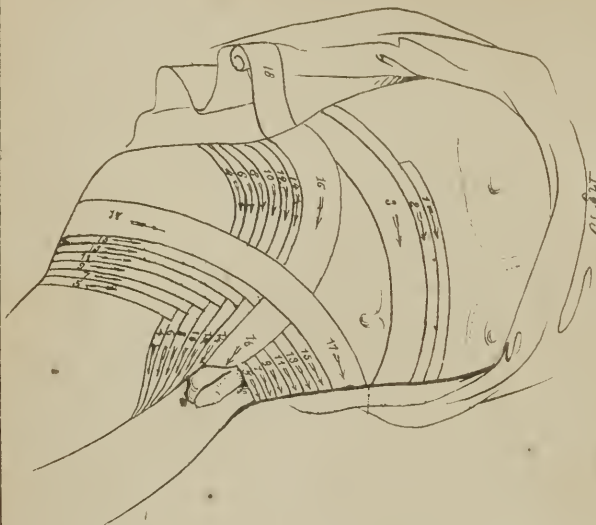
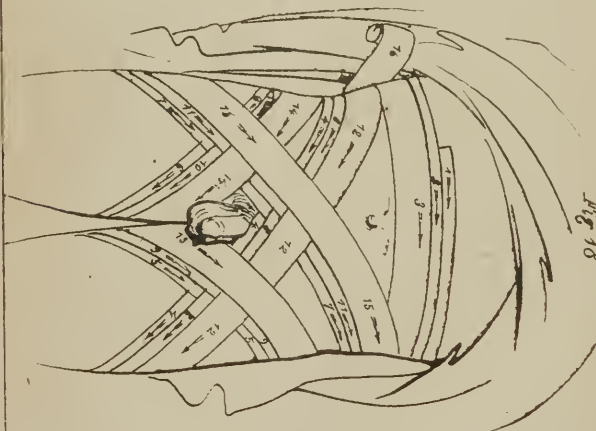
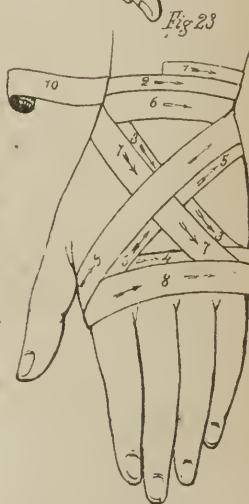
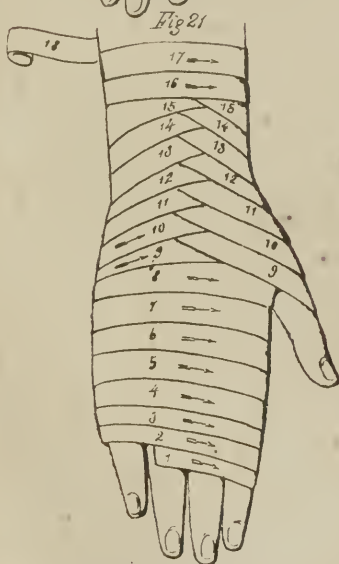
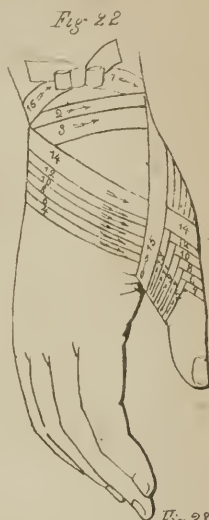
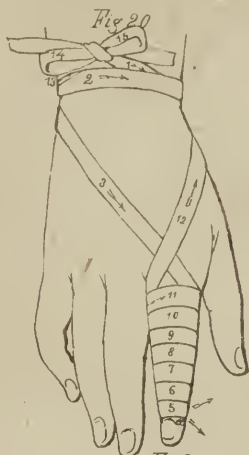


Fig 18





BANDAGES

Fig 23

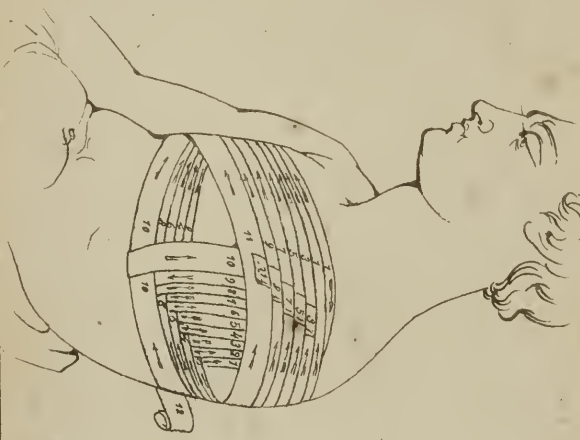


Fig. 24

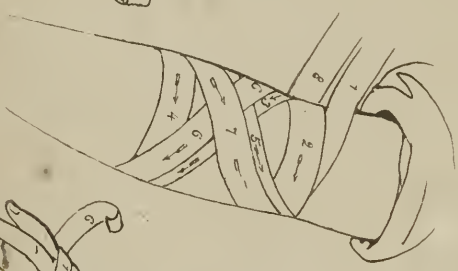


Fig 25

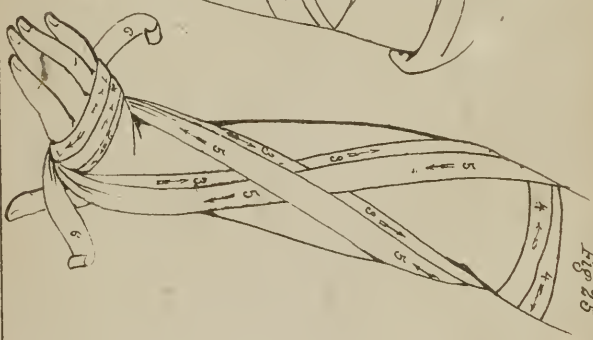
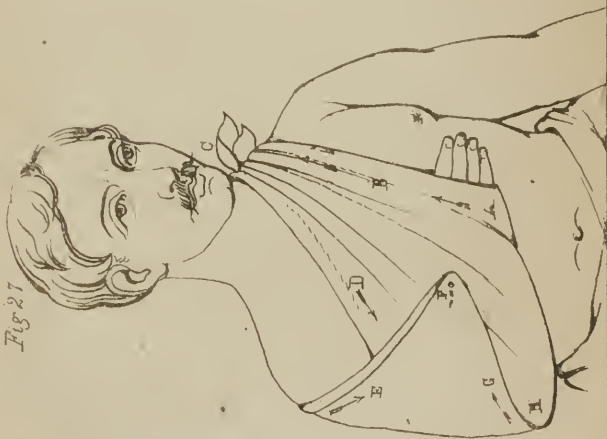


Fig 27



Asper's Mode

Fig 28

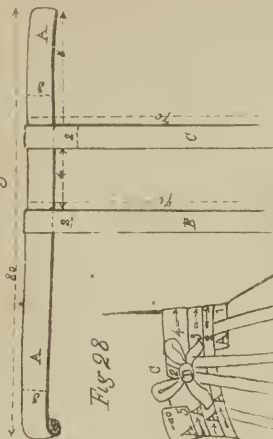


Fig 28

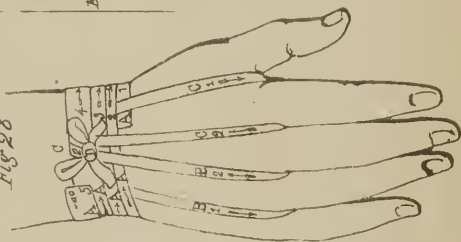


Fig 31

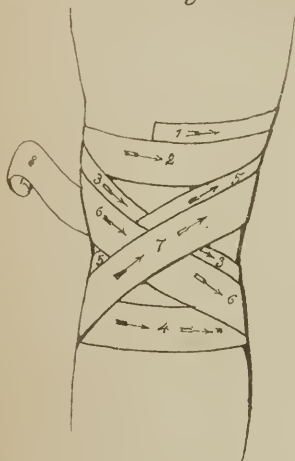


Fig 30

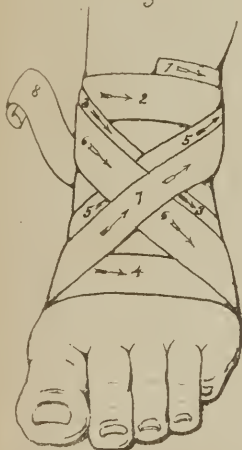


Fig 29

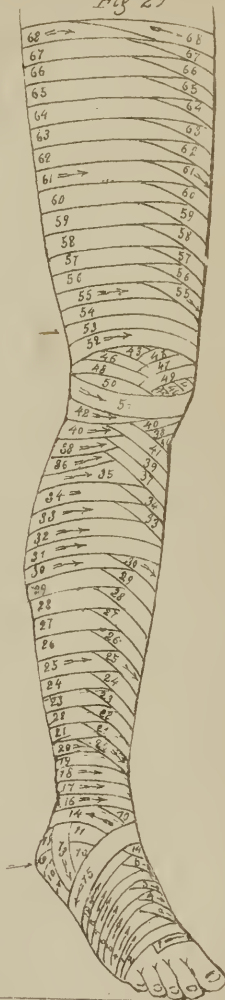


Fig 32

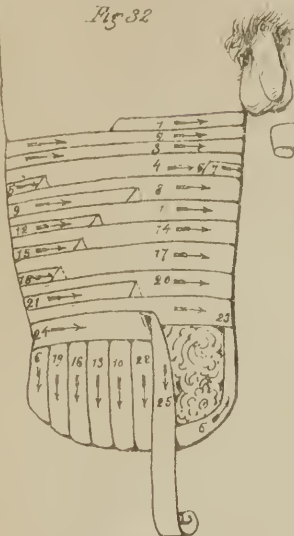


Fig 33.

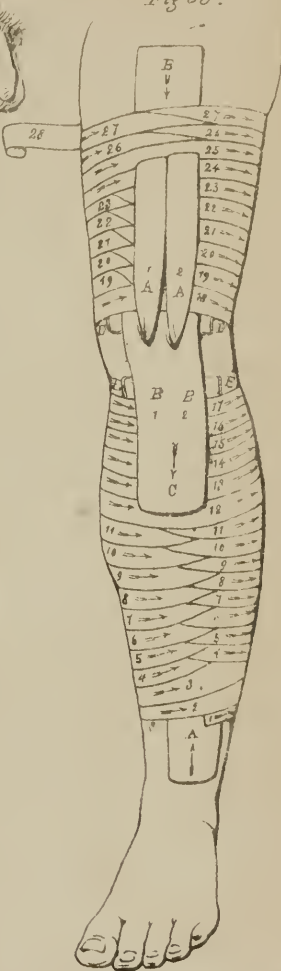


Fig 35

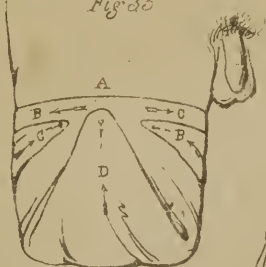


Fig 36



Fig 34



